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AUTHOR Berkell, Dianne E.; Schmelkin, Liora Pedhazur
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ABSTRACT

A study examined the perceptions of special education interns on a set of diagnostic constructs: (1) mental age; (2) developmental history; (3) IQ; (4) identifying information, (5) family history; (6) medical history; (7) receptive language; (8) fine motor coordination; (9) auditory discrimination; (10) memory; (11) written language; (12) self confidence; (13) visual discrimination; (14) attention span; (15) mathematics; (16) reading; and (17) gross motor coordination. Twenty-one students, enrolled in two sections of a university-based learning disabilities practicum, rated the similarity of all pairwise combinations of the concepts, and also rated each concept on four separate scales assessing importance of the information. Results are discussed in terms of their implications with regard to practical teacher-training considerations. (Author/JD)

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A Pre and Post-Practicum Comparison of Teacher Interns' Perceptions of Diagnostic Information

Dianne E. Berkell

C. W. Post Center, Long Island University

Liora Pedhazur Schmelkin

Hofstra University

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Running Head: Perceptual Structure

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Abstract

Special education student teachers' perceptions of a set of 17 diagnostic constructs (e.g., IQ, family history, reading, visual discrimination) were examined in this study. Prior to and following actual contact with clients, subjects were asked to rate the similarity of all pairwise combinations of the concepts, as well as to rate each concept on 4 separate scales assessing importance of the information. The primary analysis consisted of a multidimensional scaling of the similarity data. For both the pre-practicum and post-practicum data a 3-dimensional solution was retained as most appropriate. However, differences between the two solutions are evident. Results are discussed in terms of their implications with regard to practical teacher-training considerations.

Diagnosis and assessment are at the center of all good teaching and, as such, form an integral component of educational programming. However, assessing students with learning problems is a complex process; one which can be baffling and often anxiety-producing for both teachers and students alike (McLoughlin & Lewis, 1981).

Since instructional objectives and strategies depend upon how assessment data is interpreted, it is necessary to look beyond test scores when diagnosing special needs children. When evaluating children with learning problems, the teacher must relate, or connect, diagnostic data, such as test scores and developmental history, to the design of remedial procedures. This coming together, or synthesis, of diagnosis and remediation is often referred to as diagnostic-prescriptive teaching.

The extent to which a teacher effectively employs diagnostic-prescriptive teaching strategies is crucial to the success or failure of learning disabled children. Training special education teachers to be proficient in both the diagnostic and the remedial aspects of educational programming is, therefore, an important responsibility of special education teacher training programs.

Much research has been conducted in the areas of educational diagnosis and pre-service teacher training. However, the research has not attempted to tie together these two areas of diagnosis and teacher training by examining how student teachers perceived diagnostic concepts. Little attention has been devoted to studying what student teachers think of diagnostic concepts either in terms of their similarity to each other (e.g., are mental age and IQ conveying similar types of information) or in terms of their relative importance in planning remediation (e.g., which concept, mental age or IQ, is more important). Thus, relatively little is known about the importance of various types of diagnostic information for remediation, particularly from the point of view of the teacher, who is the one responsible for collecting such information prior to providing the remediation.

Several studies of teacher training were conducted in the 1970's (see, for example, Aiello, 1975; Gillespie & Sitko, 1976; Ozer & Dworkin, 1974). Research in diagnostic teaching has also been plentiful, as is evidenced by studies such as those conducted by Goldstein (1978), Reed (1981), and Sapir (1978). However, while many studies focused separately on either teacher training or educational diagnosis, studies dealing with preservice teacher training in the area of educational diagnosis have

been scarce.

There is currently a need for more knowledge pertaining to preservice teacher training in diagnostic teaching. The present study was conducted to meet this need for information. Its main purpose was to examine how special education teacher interns categorize and rate different types of diagnostic information. The investigators were interested in establishing a holistic picture of the mental set with which student teachers enter their intern experience and the subsequent effect of the internship on their mental set. In essence, the primary goal of the study was to identify and compare the cognitive structure underlying diagnostic information prior to and following the practicum experience in order to determine the effect, or impact, of a hands-on experience with learning disabled students.

Method

Sample

The sample consisted of 21 students enrolled in 2 sections of a university-based learning disabilities practicum. In the practicum, under direct supervision, students receive practical experience and are expected to tie together preceeding course work and theory. All students had completed the special education core coursework and all other requirements for the M.Ed.

degree. The majority of the participants were teachers (primarily regular classroom teachers; mean number of years teaching = 6.43, SD = 7.00).

Instruments

Diagnostic Information Scale (DIS). This scale consisted of all pairwise combinations of the 17 diagnostic concepts which were of interest (i.e., mental age, developmental history, IQ, identifying information, family history, medical history, receptive language, fine motor coordination, auditory discrimination, memory, written language, self confidence, visual discrimination, attention span, math, reading, gross motor coordination). Subjects were instructed to rate each of the 136 pairs on a 9-point scale where 1 indicated that the two concepts were not all similar and 9 indicated that the two concepts were extremely similar. The pairs were arranged in the scale according to a Ross (1934) ordering.

Rating Scales (RS). On these scales, subjects were presented with the same 17 diagnostic concepts of the DIS and asked to rate each concept on 4 separate 7-point scales. These necessitated an assessment of the degree to which each concept (a) was helpful in designing remediation, (b) was relevant to instruction, (c) was helpful in identifying the problem(s), and (d) revealed information about the individuals.

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Procedure

The instrument booklets consisted of three parts: (a) a biographical data sheet requesting information as to occupation, numbers of years teaching, and the like, (b) the DIS consisting of the 136 pairwise similarity ratings, and (c) the RS consisting of the 4 rating scales. Subjects filled out the instruments at the first session of their learning disabilities practicum, prior to any instruction or interaction with clients. At the last session of the practicum, subjects filled out the instruments again (with the exception of the biographical data sheet) so that an assessment could be made as to whether or not the structure underlying the diagnostic concepts remained the same following the practicum experience.

Results

The data contained on the DIS were analyzed by multidimensional scaling (MDS). Separate analyses were conducted for the pre-practicum and for the post-practicum data. MDS techniques attempt to uncover, in as unconstrained a way as possible, the underlying structure of a set of stimuli. Using pairwise similarity data as input, two major purposes of MDS are to determine the appropriate dimensionality of the structure (i.e., the number of dimensions that can best account for the

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similarity data), and the configuration (i.e., the nature of these dimensions). One of the advantages of MDS is that in most instances, investigators' a priori conceptions of important dimensions are not imposed on the subjects. Rather, the subjects' cognitive structure is revealed through the analysis. The primary analysis for each data set was an MDS analysis. Following the retention of the appropriate solutions, the resulting dimensional structures were related to subjects' ratings on the RS. (For detailed discussion of various MDS methods and their assumptions, see, for example, Davison, 1983; Kruskal & Wish, 1978; Schiffman, Reynolds, & Young, 1981.)

Pre-practicum Data

Subjects' pairwise similarity ratings of the stimuli were input into ALSCAL which uses an alternating least squares MDS algorithm (Takane, Young, & de Leeuw, 1977). Solutions were sought in 2 to 6 dimensions, accounting for .411, .459, .480, .526, and .557 proportion of the variance, respectively. The corresponding SSTRESS (measure of badness-of-fit) values were .425, .344, .292, .248, and .214. On the bases of these indices and upon inspection of the nature of the various solutions, the 3-dimensional solution was retained. Moreover, an inspection of the individual subject weights (indicating

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the importance of each dimension of the group solution to individual subjects) showed that beyond the 3-dimensional solution, fewer than half of the subjects had meaningful loadings (>.30) on the later dimensions.

The 3-dimensional solution (accounting for 45.9% of the variance) is presented graphically in Figures 1 and 2. The first dimension contrasts diagnostic concepts that are "skills" oriented (memory, math, auditory discrimination, attention span) versus concepts that convey more "emotional" information (self-confidence, family history).

Insert Figures 1 and 2 about here

The second dimension juxtopses concepts that convey cognitive information on the one hand (IQ, MA) versus those focusing more on physical development on the other hand (gross motor coordination, medical history, development history). On this dimension, identifying information which consisted of such information as chronological age, sex, and grade, was viewed as being on the cognitive side of the dimension and, thus, conveying some cognitive information.

The third dimension pits expressive concepts (fine motor coordination, written language) versus more

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traditional receptive concepts (receptive language, auditory discrimination). The placement of visual discrimination on this dimension is not clearly understood.

The group as a whole viewed the first dimension as being the most important, with the other two being about equal in importance. The group space appears to represent the individual viewpoints about equally. Only 3 subjects had meaningful loadings on only 1 of the dimensions. The rest of the subjects meaningfully weighted at least 2 of the 3 dimensions, with 12 subjects (about half) considering all 3 to be important).

An examination of the means for each of the 17 diagnostic concepts on the 4 rating scales revealed that overall, all the concepts were rated towards the higher ends of the scales. Thus, the subjects generally considered all 17 concepts to be important to diagnosis and remediation. Relative differences existed, however, both within scales (across concepts) and across scales (within concepts). For example, on the first scale (usefulness in designing remediation), the highest rated concept was mental age followed by auditory discrimination, visual discrimination, and receptive language. Family history was seen as the least useful. On the second scale (relevance to instructional

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intervention), the highest rated concepts were receptive language, visual discrimination, written language, auditory discrimination, and attention span. Family history was again rated the lowest, with developmental history and identifying information also relatively lower than the other concepts. Contrary to what occurred for the first 2 scales, medical history was rated the highest on the 3rd scale (helpfulness in identifying the problem). In a similar fashion, developmental history was rated the highest on the 4th scale (revealing information about individuals).

In order to examine the usefulness of these 4 rating scales as external aids in the interpretation of the results of the MDS, the rating scale means were regressed on the coordinates of the 3-dimensional MDS solution. Only the regression analysis for the second rating scale yielded a significant finding ($F = 7.34$; $df = 3, 13$; $p < .01$), accounting for 63% of the variance. The largest regression coefficient was for the first dimension indicating that this dimension was most related to "relevance to instructional intervention."

Post-practicum Data

As for the pre-practicum data, solutions for the post-practicum data were sought in 2 to 6 dimensions, accounting for .439, .491, .510, .548, and .570 proportion

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of the variance, respectively. The corresponding SSTRESS values were .415, .335, .283, .242, and .211. The 3-dimensional solution (Figures 3 and 4), accounting for 49.1% of the variance was retained for interpretation.

Insert Figures 3 and 4 about here

The first dimension clearly separates the "skills" concepts from the background information concepts. This is evidenced by the placement of written language, reading, visual discrimination and math at one end, while family history, medical history, developmental history, identifying information, MA, and IQ are at the other end of the continuum.

The second dimension places emphasis on fine motor coordination and identifying information versus auditory discrimination, receptive language, and attention span. While somewhat ambiguous due to the placement of identifying information, this dimension seems to convey a contrast between expressive and receptive modes.

On the third dimension, gross motor coordination anchors one side, followed by self-confidence. On the other side are memory, IQ, MA, and math. Again, some distinction is being made between more cognitive concepts and physical concepts.

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The distribution of the rating scales data was similar to that found on the pretest. The majority of the ratings tended to be close to the very useful or helpful end of the continuum (in the 5 to 6 range on a 7-point scale). The first two scales, however, showed greater differentiation among the concepts. Thus, subjects were able to distinguish among the concepts in terms of their usefulness in designing remediation and relevance to instructional intervention. On the last two scales--helpfulness in identifying the problems, revealing information about individuals--less differentiation was evident among the concepts. The regression analyses revealed that, in addition to providing more distinctive information, the first two rating scales were also most related to the perceptual space resulting from the MDS. Specifically, the regression analysis for the first scale yielded a multiple R of .94 ($F = 31.61$; $df = 3, 13$; $p < .001$). For the second scale, the multiple R was .95 ($F = 42.98$; $df = 3, 13$; $p < .001$). The regression coefficients in both analyses indicated that the first dimension played the largest role. Thus, from the point of view of the student interns, conceptualizing the diagnostic concepts in terms of "skills" versus background information seems to be most useful in terms of designing remediation and instructional intervention.

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Discussion and Implications

The initial concern in this investigation was with determining the nature of the interns' perceptions (i.e., the manner in which they viewed diagnostic data) prior to the practicum experience. It was felt that knowledge about these preconceived ideas would be helpful in (a) ascertaining the effects of students' prior training and experiences, (b) focusing the practicum to make it more useful in light of students' perceptions, and (c) determining whether these perceptions would change following a semester of clinical experience with learning disabled students.

Traditionally, the major portion of teacher training programs has consisted of a combination of lecture and readings with a culminating practicum or student teaching experience. One objective of the clinical experience is to develop proficiency in applying diagnostic information to remediation. In essence, the practicum provides teacher interns with an opportunity to apply theoretical knowledge in a practical setting. In order to facilitate the development of diagnostic-prescriptive teaching skills, it is necessary for the practicum supervisor to have a clear picture of the mental set of incoming interns.

The results of the present study indicated the

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existence of three contrasting dimensions in the pre-practicum data: (a) skills versus emotional development, (b) physical versus cognitive development, and (c) receptive versus expressive capabilities. These dimensions reflect the interns' interpretations of content presented in their previous coursework and may also have been influenced by previous teaching experiences with nonhandicapped or handicapped students.

On the pretest, the strongest contrast was found between skill level and emotional development. These two areas (academic skills and social-emotional development) are frequently addressed in isolation in texts, and it is, therefore, not surprising to note that the interns viewed them as being extremely removed from each other.

Research has shown, however, that skill achievement levels and emotional factors, such as self-concept, are closely related (Goldman & Hardin, 1982). In fact, a frequently cited objective of special education teachers pertains to improving their students' self-image. One effective method for improving self-image involves improving the child's ability in academics. It would, thus, appear that these two areas are more closely related than the teacher interns have indicated.

Responses on the posttest showed a major change in the manner in which the teacher interns perceived academic

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skills and social-emotional development. More specifically, on the posttest, the basic academic skill areas of reading, math, and writing appeared even closer together than had been shown to be on the pretest. Self-confidence which had, prior to the practicum, been considered to be most closely related to family history and not at all related to academic ability moved closer to academic skills. The change clearly showed that the intern experience (i.e., student contact) influenced the manner in which diagnostic information was perceived and interpreted.

It is interesting to note that the interns initially viewed self-confidence as being related to family history but separated from skill development. Several studies have illuminated the effects of family history and child-rearing styles on social skills (e.g., Elardo & Freund, 1981; Lerner, 1981; Wetter, 1972), while research on the relationship between academic achievement and self-confidence has been somewhat less plentiful.

Another contrasting dimension involving cognitive and physical factors was revealed on both the pre and posttests. On this dimension IQ was seen as separate from perceptual-motor skills. While certain intelligence tests, such as the Slosson Intelligence Test do not emphasize perceptual-motor skills, other instruments

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(e.g., Wechsler Intelligence Scale for Children Revised) rely heavily on visual-motor integration performance to determine the child's IQ score.

The third dimension (expressive-receptive) has more distinct skill delineations that do the other two dimensions. For example, reading is clearly a receptive skill while writing is expressive. On the pretest, the interns showed that they perceived these skills as being relatively unrelated. Responses on the posttest, however, differed, indicating an increased awareness of the close relationship between reading and written expressive ability.

The three dimensions discussed in this section serve to highlight areas of contrast and similarity as seen by special education teacher interns. The change in the interns' perceptions on the posttest shows a tendency to group together alterable variables (i.e., those skills and abilities that can be trained and taught) such as reading, mathematics, and written expression (Bloom, 1981). This tendency is similar to the recent trend which has characterized the last decade in education as one in which researchers and practitioners have moved away from measuring static constructs (such as intelligence, visual discrimination, and auditory memory) and moved towards measuring and teaching alterable skills and abilities

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(Gersten & Carnine, 1984).

The benefits of clinical, or practical, experience are clearly evident upon examination and comparison of the interns' responses prior to and following the practicum. The findings of the present study support the need for opportunities to apply theory and coursework in practical settings during preservice training. A possible direction for future research in the area of special education teacher training might involve investigating the types of practical experiences which should be provided as well as determining at which points in teacher training programs each type of experience would be most beneficial.

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Figure Caption

Figure 1. Pre-practicum dimensions 1 (horizontal) and 2 (vertical).

Figure 2. Pre-practicum dimensions 1 (horizontal) and 3 (vertical).

Figure 3. Post-practicum dimensions 1 (horizontal) and 2 (vertical).

Figure 4. Post-practicum dimensions 1 (horizontal) and 3 (vertical).

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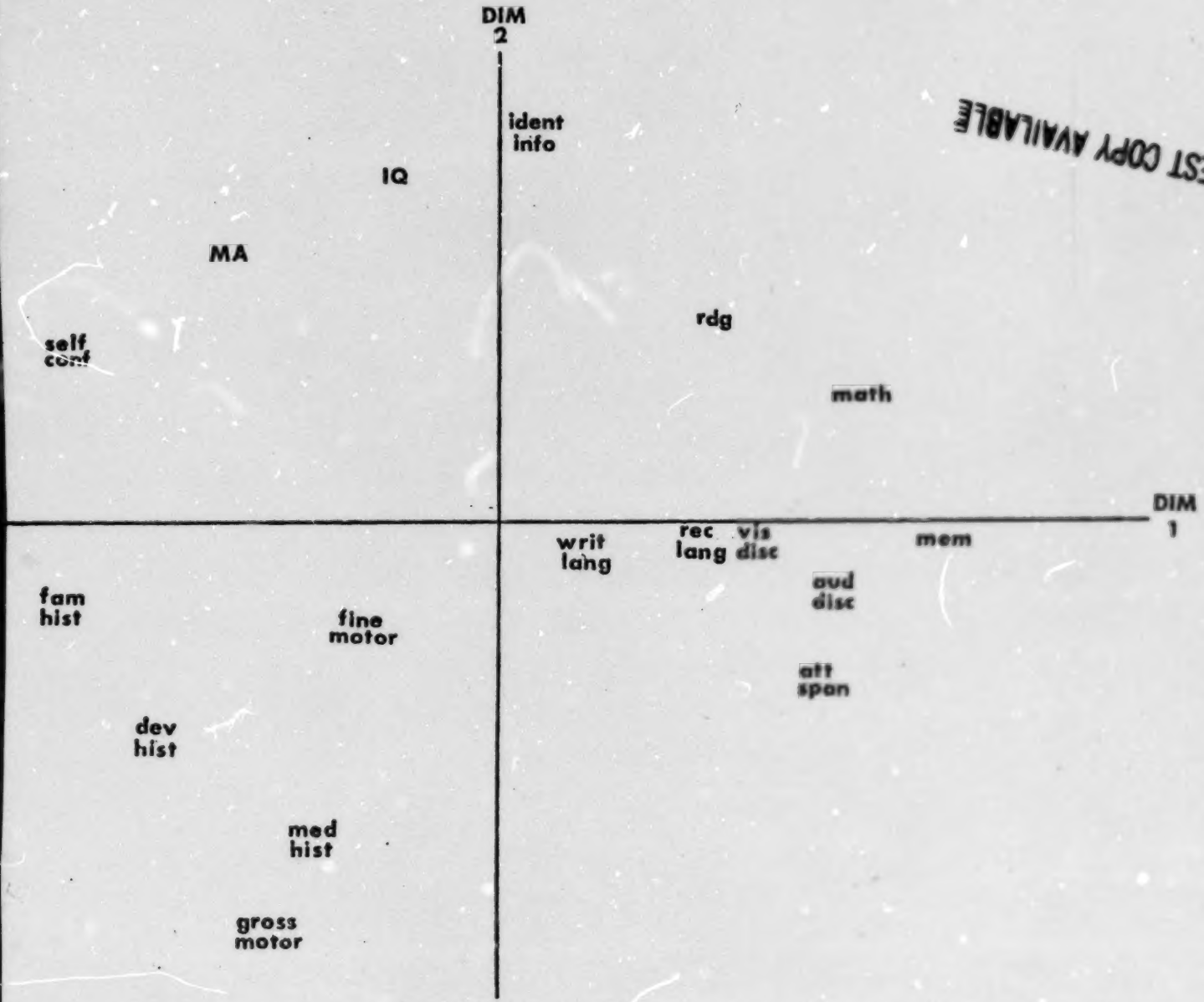

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Figure 1. Pre-practicum dimensions 1 (horizontal) and 2 (vertical).

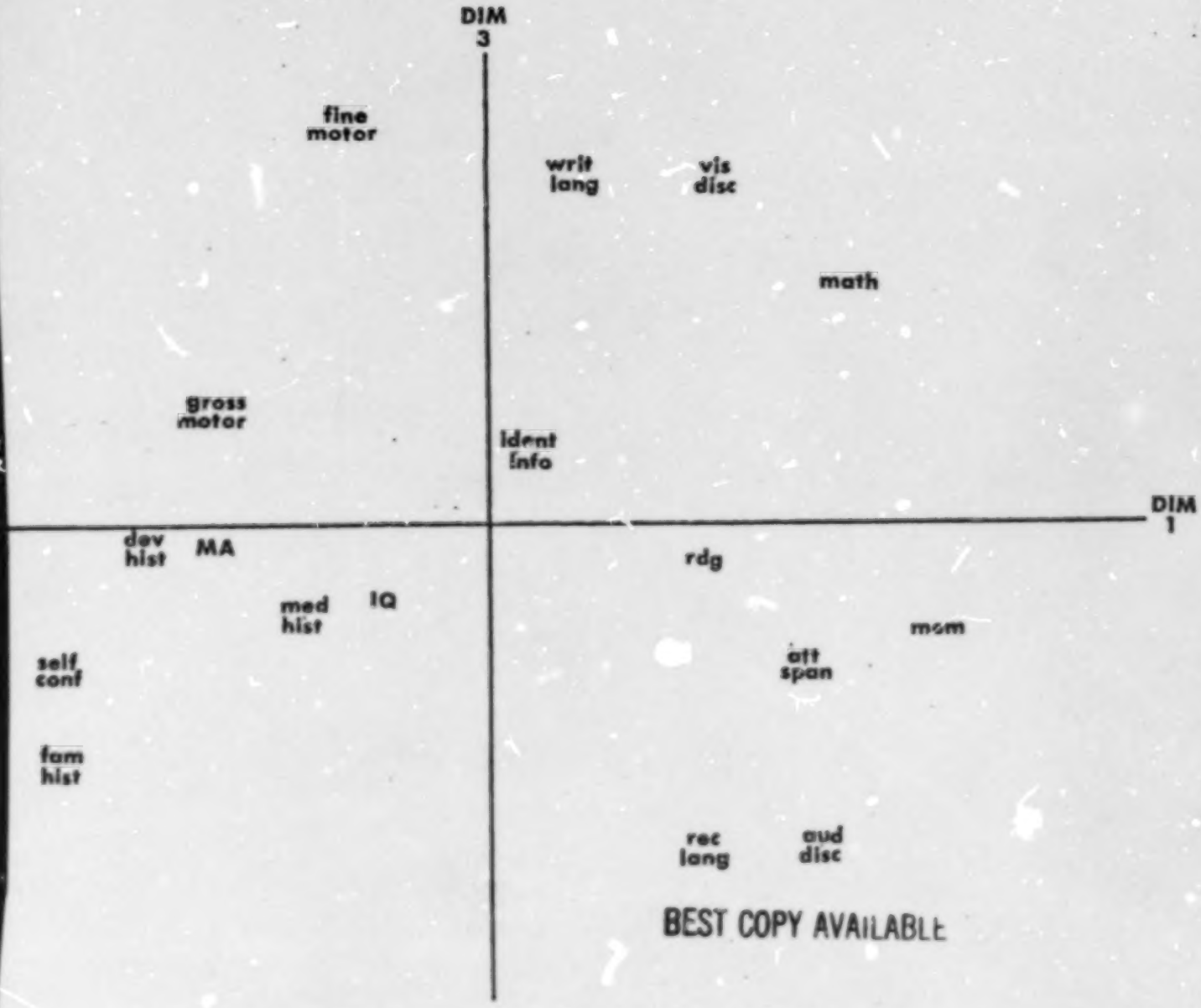

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Figure 2. Pre-practicum dimensions 1 (horizontal) and 3 (vertical).

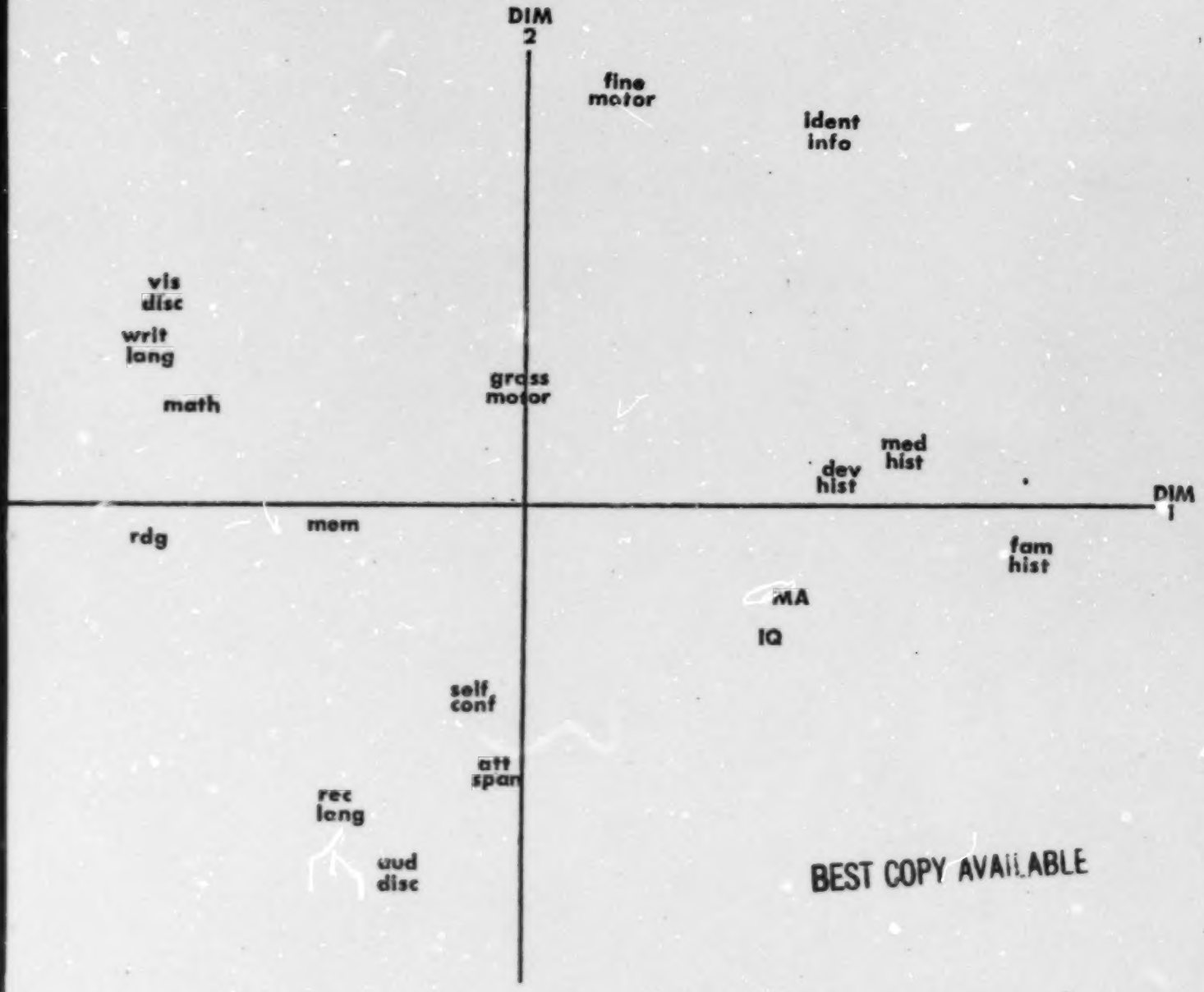

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Figure 3. Post-practicum dimensions 1 (horizontal) and 2 (vertical).

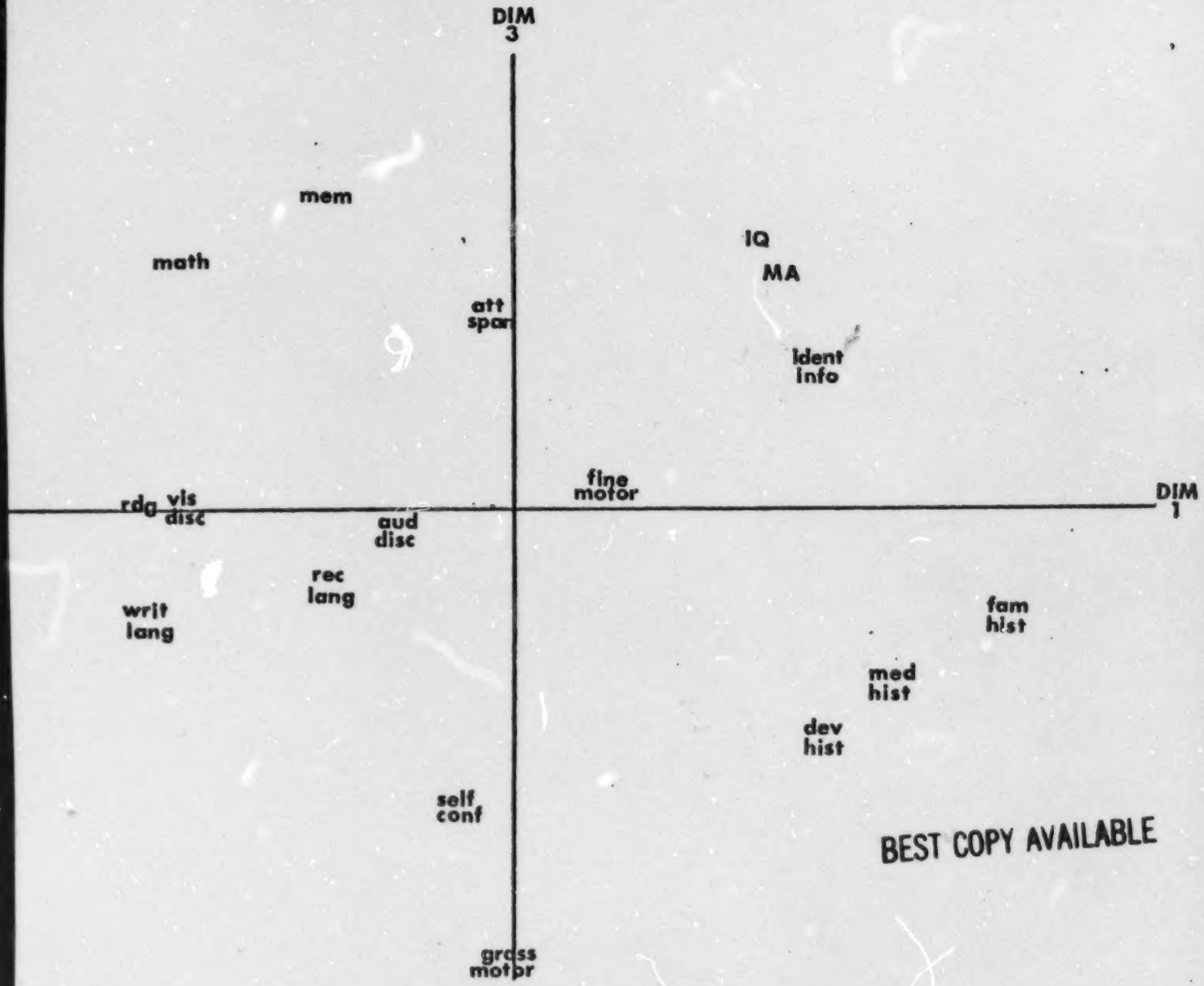

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Figure 4. Post-practicum dimensions 1 (horizontal) and 3 (vertical).